R E P O R T R E S U M E S

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TECHNICIANS IN NATURAL RESOURCE MANAGEMENT, A RESEARCH STUDY TO DETERMINE THE NEED FOR EDUCATION OF TECHNICIANS IN THE NATURAL RESOURCE AREAS OF FORESTRY, RECREATION, AND WILDLIFE.

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DESCRIPTORS- *TECHNICAL OCCUPATIONS, SKILLED OCCUPATIONS, SEMISKILLED OCCUPATIONS, *OFF FARM AGRICULTURAL OCCUPATIONS, *EMPLOYMENT OPPORTUNITIES, *EDUCATIONAL NEEDS, OCCUPATIONAL SURVEYS, VOCATIONAL AGRICULTURE, JUNIOR COLLEGES, TECHNICAL EDUCATION, *NATURAL RESOURCES, FORESTRY, WILDLIFE MANAGEMENT, RECREATION, CALIFORNIA,

QUESTIONNAIRES WERE ADMINISTERED TO SELECTED REPRESENTATIVES OF THE FORESTRY, RURAL RECREATION, AND WILDLIFE MANAGEMENT AREAS OF PUBLIC AND PRIVATE ENTERPRISES IN NORTHERN CALIFORNIA TO DETERMINE THE EMPLOYMENT OPPORTUNITIES AND TYPE OF TRAINING NEEDS REQUIRED FOR TECHNICAL, SKILLED, AND SEMISKILLED PERSONNEL. THE PRIMARY OBJECTIVE OF THE STUDY WAS TO DETERMINE THE ROLE OF THE JUNIOR COLLEGE IN PROVIDING THE NECESSARY TECHNICIAN LEVEL TRAINING IN THE NATURAL RESOURCE AREAS. THE ANTICIPATED NUMBER OF FULL-TIME PLACEMENT OPPORTUNITIES FOR 1970 WAS (1) FORESTRY--64 PROFESSIONAL, 209 TO 219 TECHNICAL, AND 65 TO 90 SKILLED AND SEMISKILLED, (2) RURAL RECREATION--8 PROFESSIONAL, 72-82 TECHNICAL, AND 40 SKILLED AND SEMISKILLED, AND (3) WILDLIFE MANAGEMENT--30 PROFESSIONAL, 20 TECHNICAL, AND 31 SKILLED AND SEMISKILLED. GENERAL EDUCATION ABILITIES IN COMMUNICATION SKILLS, APPLIED MATHEMATICS, PERSONNEL MANAGEMENT, TECHNICAL DRAWING, SKETCHING, AND READING MAPS AND BLUEPRINTS, WERE GENERALLY RATED VERY IMPORTANT FOR TECHNICIANS IN THE THREE AREAS. IT WAS CONCLUDED THAT (1) THERE IS A VERY DEFINITE NEED IN BOTH PRIVATE AND PUBLIC SECTORS FOR PEOPLE TRAINED AT THE TECHNICAL, SKILLED, AND SEMISKILLED LEVELS FOR THE FORESTRY, RURAL RECREATION, AND WILDLIFE MANAGEMENT FIELDS, ALTHOUGH THE GREATEST NEED IS AT THE TECHNICIAN LEVEL, AND (2) THE JUNIOR COLLEGES CAN OFFER NEEDED INSTRUCTION FOR TRAINING TECHNICIANS IN THESE AREAS. A SAMPLE QUESTIONNAIRE AND COPIES OF CORRESPONDENCE ARE INCLUDED IN THE APPENDIXES. (WB)

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TECHNICIANS IN NATURAL RESOURCE MANAGEMENT

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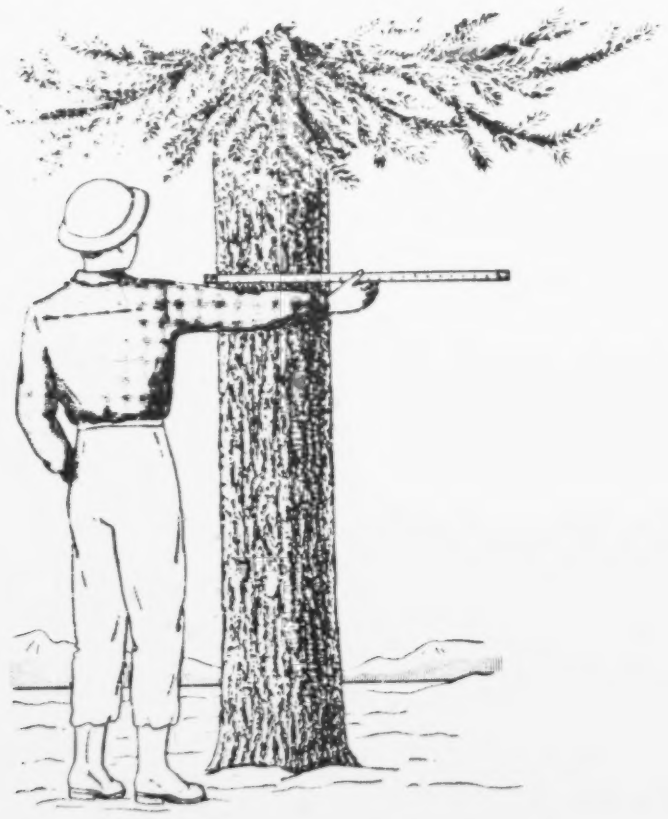
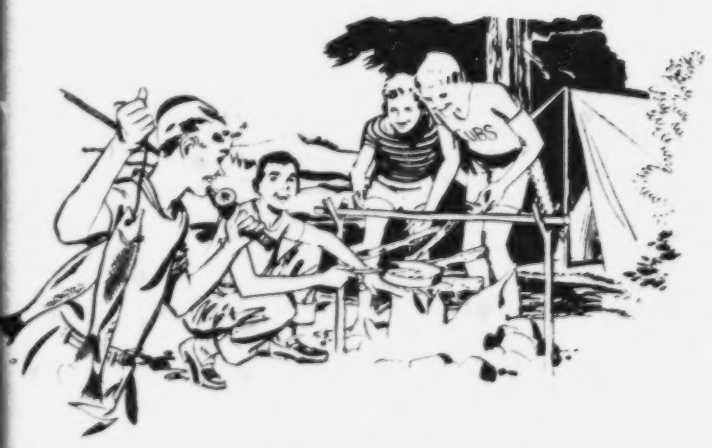


FORESTRY



RECREATION

WILDLIFE

VT 01373

Agriculture Department
Modesto Junior College
Modesto, California

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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TECHNICIANS IN NATURAL RESOURCE MANAGEMENT

A Research Study To Determine The Need For Education Of Technicians In The Natural Resource Areas Of Forestry, Recreation And Wildlife.

This study was carried out under the Vocational Education Act of 1963, Public Law 88-210, in cooperation with the California Bureau of Agricultural Education and the Yosemite Junior College District.

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PREFACE

This study was intended to determine the employment opportunities and the type of training required for persons intending to enter forestry, rural recreation and wildlife management at the technical, skilled and semi-skilled levels. In response to the pace of our ever changing society, Modesto Junior College recognized the need for a study in depth to determine employment opportunities and needs of personnel preparing for employment at the technical level.

In view of the increasing population heavy demands will be placed on California's natural resources. The people of California need increasing amounts of wood, water, wildlife and recreational areas. The federal and state governments have further emphasized the importance of these needs.

The primary objectives of the study were to determine answers to the following questions relative to the role of the junior college.

1. What is the possibility of technician level training in the natural resource areas?

2. What are the needs in both the private and public sectors of the economy as to employment and opportunities in natural resources areas?

3. What are the levels and kinds of training required to prepare for such employment?

4. Does there exist a core of instructional material common to these natural resource areas?

5. What is the extent of present facilities and needs in Yosemite Junior College District?

A large number of public agencies and individuals participated in this study and appreciation is extended to all for the assistance and suggestions which were given.

Lumber Mills
U. S. Forest Service
California Division of Forestry
Bureau of Land Management
Department of Parks and Recreation
Department of Fish and Game
Bureau of Sport Fisheries and Wildlife
Fish Farms
Oakdale Hunting Club
Game Farms
Guest Ranches
National Park Service
County Parks and Recreation Departments

Specific appreciation is acknowledged to Dr. Kenneth Rowland, Vice President of Yosemite Junior College District, and Mr. E. A. Tarone, Chairman of the Modesto Junior College Agriculture Department.

Acknowledgment is extended to members of the Modesto Junior College Agriculture Department staff who served as a validating committee.

Dr. Kenneth Baker, Instructor, Agricultural Department
Mr. D. Dwight Wait, Instructor, Agricultural Department
Mr. Luverne Donker, Instructor, Agricultural Department

Harold C. Whaley
Project Director

JUSTIFICATION

With the encouragement of the California State Department, Bureau of Agricultural Education, Modesto Junior College has conducted studies in regard to agricultural technicians. The first study was made by Mr. Jerry Halterman in 1961 and entitled "A Research Project in Agriculture Technology." It identified and classified those individuals who might properly be termed as technicians in agriculture. In 1963 Mr. Luverne Donker made an additional study in this area which is entitled "Agricultural Technicians." This study was an investigation into the nature of the work actually done by agricultural technicians. Both these studies indicated a need for personnel in the natural resource area.

In 1964 a committee composed of individuals from the forestry industry met together at Modesto Junior College and very strongly indicated a need for people trained at the technical level.

Due to increased interest many high school agricultural departments are including a unit of forestry in their curriculum. Some are including instruction in rural recreation and wildlife production. It is important that the junior college offer advanced instruction in these areas.

One-tenth of the total population in the United States can now be found in California. This exploding population is putting an increasingly severe strain on its rich, but limited, natural resources. How these resources will be managed will determine what water, wood, forage, wildlife, mineral and opportunities for recreation will be available to meet the needs and desires of its own and other citizens.

Today the federal government owns some 45 per cent of California's land acreage; the state, counties and other local governmental units own some 3 per cent; and the remaining 50 per cent is in private ownership. With the exception of a small area of military reservations and administrative sites, the area now in federal and state ownership consists almost entirely of "wildlands." California's wildlands are owned and managed by numerous federal and state agencies in several different departments, and by tens of thousands of individuals and corporations. These wildlands produce the wood, water, forage, wildlife and recreation of California.

The number of people in the state is increasing daily. Many new citizens are being born; many are pouring in from other states; many other older citizens, in a sense, are added to the population because they are living longer, healthier lives. Half again as many people are in California today as were in 1950. Each new person needs, and perhaps demands, recreation, housing, and increased facilities. But beyond this, more Americans are enjoying the out-of-doors. They have far more time and freedom to travel; they have more money to spend; they can and will travel farther with greater ease and speed. Since 1940 California's visitors have increased 2-1/2 times. By 1980 it is estimated that there will be 11 million pleasure visitors to further overload natural resources of the state.

There were 14.8 million residents of California in 1958, or more than twice the 1940 population of 6.9 million. By 1980 the number is expected to reach 28.5 million. This is a doubling of the population about every 20 years.

Another factor of consideration is the age group of California's population. Children and youth form a growing proportion of the population. In 1940 children and youth were only one in four; by 1958 they were one in three, and the outlook is for further increase.

About 60 per cent of the workers hold full-time jobs and can be considered among those who receive "paid" vacations and holidays. These 3.7 million have 37 million days of paid time off. They also have "unpaid" week-end time amounting to more than 370 million days.

Personal income in California is greater than the national average. Income, together with leisure time a person has available, age, interest, and his ability to go places, determines in part how and where his leisure time will be spent.

Recreation Defined:

Outdoor recreation has been defined as "the use of the outdoor environment for enjoyment and well-being." What does outdoor recreation include? The major activities in outdoor recreation are:

1. Recreational travel by motor vehicle, airplane and train.

2. Sightseeing and study, viewing scenic areas; visiting contemporary man made developments, parks and historical sites, fairs, festivals; study of rocks, minerals and flora; recreational photography, painting, and sketching.

3. Picnicking, family and groups.

4. Camping, family or group en route or overnight.

5. Riding and hiking.

6. Swimming in ocean, lake, stream beaches and pools.

7. Boating, including water skiing.

8. Fishing.

9. Hunting.

10. Winter activities, skiing and snow play.

Recreational Travel

Almost one-third of the passenger-car mileage was for social and recreational purposes in 1960. Such mileage nearly tripled between 1940 and 1960, and is expected to nearly triple again by 1980.

Picnicking

In 1958, about 48 million "visitor days" were spent in California. (A visitor day is defined as the attendance of one person at a picnic ground on one day.) Nearly one-third of California's picnic units were used beyond maximum

safe capacity. In 1958 there were only 62,000 units available in California. It is estimated that the demand for picnicking in 1980 will require more than 225,000 units.

Camping

In 1958 at least 13 million "camper days" were spent in the out-of-doors. Each night that an individual spends in a camp is considered a "camper day.") Californians used 29,000 developed camp units. These units were used an average of 426 camper days that year. The northwest averaged 200 camper days, while the south averaged more than 1,200 camper days. Over use of camping facilities results in unpleasant overcrowding, in deterioration and destruction of the natural and man made facilities in the camp area, in undue stress on the water and sanitary systems, and increases the problems of management and maintenance. Projections for camper-days usage in California will increase from the 13 million in 1958 to 28 million in 1970, and over 40 million camper-days in 1980. By 1980 there will be a need for 130,000 camp units.

Fishing

In 1957 there were an estimated 1.8 million fishermen in California. By 1980, at the present rate of population increase, there will be approximately 5.4 million fishermen. Areas of recreational values by fishing include trout; warm water fish such as black bass and striped bass; salmon and steel head; ocean shore fishing; and deep sea fishing.

Hunting

Recreational hunting for game has doubled in California since 1940. In 1957-58 there were 647,218 licenses sold. By 1980, with a tapering off, there will be an estimated 1,300,000 hunters.

Forestry

California ranks second to Oregon in the United States in total volume of timber cut from the forest. Its forest industry produces about one-sixth of the total U. S. lumber output. With the rapid population growth, California is, and will continue to be, the largest market for wood products in the United States. For instance, Stanislaus National Forest sold approximately 160 million board feet of lumber in 1964. This was enough lumber to build 14,500 3-bedroom homes.

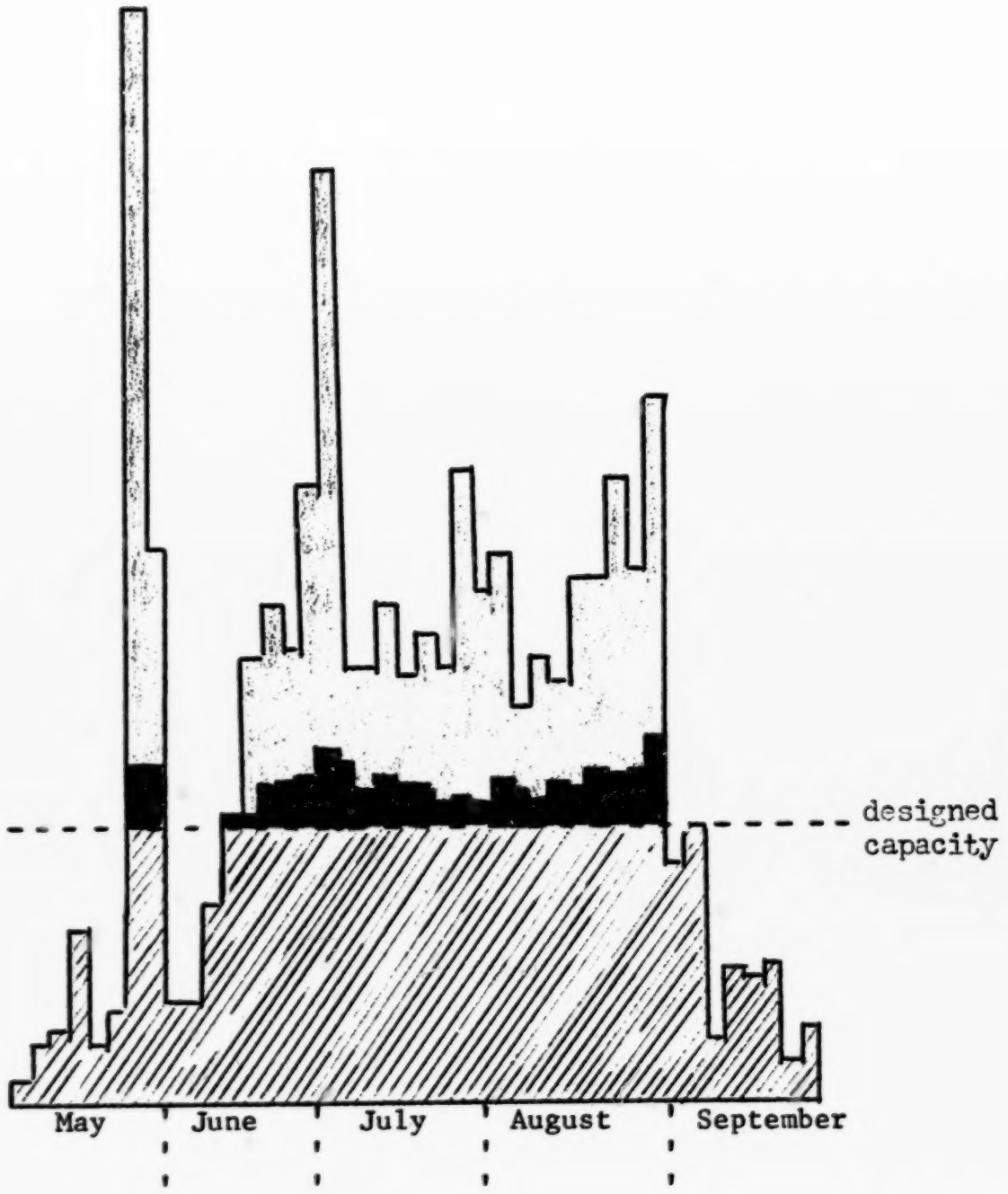
References: California Public Outdoor Recreation Plan
Documents Section, Printing Division
Sacramento, California

Outdoor Recreation Resources Review Commission
Superintendent of Documents, U. S. Government Printing Office
Washington, D. C.

Your Report on Stanislaus National Forest Activities for 1964
Forest Service
U. S. Department of Agriculture
Sonora, California

TABLE 1

PRESENT USE OF A TYPICAL CAMPING AREA



WEEKEND CAMPING DEMAND

unsatisfied demand

overload

satisfied demand

In general outdoor recreation areas and facilities are overused by more than 30 per cent.

P. 43, Calif. Public Outdoor Recreation Plan Part I
State of California Documents Section, Printing Division, Sacramento, Calif.

STATEMENT OF PROBLEM

As noted in the preface, the five basic objectives of the study were the questions to be answered by information obtained from the survey. Three factors indicated a need for a study in depth in these natural resources areas. (1) Many students at the junior college level desire to enter one of these fields as their profession or vocation. Some of these students will continue to a four-year institution. However, many students will terminate their education at the junior college level. The question was asked, what are the employment opportunities for these students? Should we in education encourage these students to continue their interest in forestry, recreation or wildlife management, or should we advise them to consider other fields because personnel at the sub-professional level was not needed? This raised the second basic question. (2) What is the need for the technical, skilled and semi-skilled trained person? The answer may be found within the significant changes and developments that have occurred in the labor force in agriculture and related fields which suggest a need for technically trained people. (3) The third basic question coming into view was, who is going to handle the multitudes of people who will be using California's wildlands? Also, who will develop and maintain the facilities? It was felt that in this natural resource area there will be a greater need for additional personnel than the present labor force. People with a junior college education might qualify for such positions at the sub-professional levels. These people would not replace the professional, but would complement him and therefore release him for the level of employment for which he was prepared.

DISCUSSION OF THE DATA

1. Method and Procedure

An overall plan was developed to be used as a guide in conducting this study. Due to the size of the three areas being studied, the project study had to be restricted in certain areas. The procedure was to contact personnel of the public agencies and firms to obtain sources of information and other studies which might have been done in the various areas being considered. Meetings were attended, material collected which could be used for reference, and the University of California Agricultural Extension was contacted for further enlightenment on the project.

The geographic area covered in the survey was represented by groups throughout northern California. The natural resource area was so diversified that it was necessary to survey a large extensive geographic area. Forestry was predominantly located in the foothills and mountainous areas of California, and was considered a major enterprise in various parts of northern California. Recreation was of major importance in the wildlands of the state, and in the state and national parks which cover large geographic areas and are found to be great distances apart. Wildlife management (also known as fish and game) was so diversified that it covered all geographic areas from the coast to the valleys and mountains. Private enterprise was lacking in some areas of study in this particular geographic region, and therefore caused the project director to survey persons in districts distant from Modesto.

After sources of material were obtained and some restrictions were placed on the breadth of the study, such as types of recreation to be included, a sample questionnaire was developed. Representatives of all the project study areas were selected as a pilot group for administering the questionnaire as to its clarity and validity of the replies. The questionnaire was then administered to representatives by the project director throughout the area served by the junior college district. The survey became more meaningful as personal contacts continued to develop. Questionnaires were sent through the mail to those too distant or remote to make it feasible for personal contact. An effort was made for an equal distribution of the questionnaires among the Forestry, Recreation and Wildlife Management of public and private enterprises, wherever possible. These included:

1. Private lumber companies
2. U. S. Forest Service
3. California State Division of Forestry
4. Bureau of Land Management
5. Department of Parks and Recreation
6. National Park Service
7. County Parks and Recreation
8. Private campgrounds
9. Trout farms
10. National Wildlife Refuge
11. Sportsmen Club
12. Department of Fish and Game
13. Private Game Farm

Although this procedure was found to be very effective, it involved many miles of travel and considerable time. Through these personal contacts, public meetings and correspondence, it was possible to acquaint interested personnel in the project. Their cooperation and assistance were far beyond the normal expectations of the project director.

2. Statistical Results

An attempt was made to determine the availability of positions to be offered to junior college graduates in the areas of forestry, recreation, and wildlife management, and to determine the educational needs of the general education and technical skills pertinent to their potential employment.

Tables 2, 3, and 4 show the various levels and kinds of employment, present and future employment needs--both full and part time--and the salary range. These tables will serve as a guide to students interested in these areas of employment. It was brought to the attention of the project director that future employment needs were on a conservative basis.

Tables 5, 6, 7 show the significance of each subject as to the importance of knowledge in the various areas of employment. From these tables, one is able to determine the relative value of each skill or ability within the specific chosen area of forestry, recreation, or wildlife management.

The bar graphs are based on a percentage average of "very important" and "important" ratings. A comparison of skills are shown between the three areas of study. The correlations made in relation to the importance of each skill are further evidence in setting up a curriculum in natural resources.

TABLE 2

FORESTRY LABOR FORCE INFORMATION

Level of Occupational Preparation and Examples of Job Titles	Approximate Salary Full Time	Total No. Employed 1964-1965		No. of Placement Opportunities per yr. Anticipated 1970	
		Full Time	Part Time *	Full Time	Part Time *
PROFESSIONAL Forest Supervisor District Ranger Forestry Graduate Trainee	425-1150	209	12	64	4
TECHNICAL Forestry Aids Timber Cruiser Scaler Salesman Forestry Foreman Fire Control Officer	425--750	1057	114	209-219	150-178
SKILLED and SEMI-SKILLED Lumber Handler Equipment Operator Fire Fighter Sawyer	345--510	920	227	65--90	1871 (1)

* Consider a part-time employee as one working 6 months or less.

(1) This figure includes seasonal fire fighters.

NOTE: These figures are representative of the surveyed area only.

TABLE 3

RECREATION LABOR FORCE INFORMATION

Level of Occupational Preparation and Examples of Job Titles	Approximate Salary Full Time	Total No. Employed 1964-1965		No. of Placement Opportunities per yr. Anticipated 1970		
		Full Time	Part Time *	Full Time	Part Time *	
PROFESSIONAL Park Ranger Park Naturalist Park Supervisor	486-717	40	65	8	4	
TECHNICAL Park Attendant Engineering Aid Maintenance Park Foreman Fire Control Foreman	380-510	36	21	72-82	6	
SKILLED and SEMI-SKILLED Equipment Operator Fire Fighter Park Aid Building Maintenance	345-500	108	205	40	1060	(1)

* Consider a part-time employee as one working 6 months or less.

(1) This figure includes seasonal fire fighters.

NOTE: These figures represent the area within the Modesto Junior College service area.

TABLE 4

FISH AND GAME LABOR FORCE INFORMATION

Level of Occupational Preparation and Examples of Job Titles	Approximate Salary Full Time	Total No. Employed 1964-1965			No. of Placement Opportunities per yr. Anticipated 1970		
		Full Time	Part Time	*	Full Time	Part Time	*
PROFESSIONAL Game Manager Fishery Biologist Pollution Bio-Analysis	486-590	179			30		
TECHNICAL Fish and Game Assistant Fisheries Manager Fish and Game Warden	440-510	306			20		
SKILLED and SEMI-SKILLED Equipment Operator Seasonal Aid	440	204	17		31	8	

* Consider a part-time employee as one working 6 months or less.

NOTE: Figures from the California Department of Fish and Game are on a state wide basis.

TABLE 5

SUMMARY OF EMPLOYERS RESPONSE TO GENERAL EDUCATION ABILITIES NEEDED BY THE TECHNICIAN IN FORESTRY

Abilities	Very Important	Important	Of Some Importance	Unimportant
	%	%	%	%
Communication skills:				
Speech	57.1	21.4	21.4	0.0
English composition	42.9	42.9	07.1	07.1
Reading	64.3	28.6	07.1	0.0
Mathematics skills:				
Applied arithmetic	35.7	64.3	0.0	0.0
Elementary algebra	07.1	28.6	50.0	14.3
Advanced algebra	0.0	0.0	28.6	71.4
Plane geometry	07.1	28.6	50.0	14.3
Trigonometry	07.1	07.1	35.7	50.0
Science skills:				
Biology, general	21.4	28.6	14.3	35.7
Botany, general	14.3	50.0	14.3	21.4
Zoology, general	14.3	14.3	14.3	57.1
Other skills:				
Electricity	07.1	35.7	14.3	42.9
Technical drawings	14.3	50.0	35.7	0.0
Typing, personal	0.0	28.6	50.0	21.4
Accounting	0.0	07.1	71.4	21.4
Personnel management	42.9	28.6	21.4	07.1
Economics	0.0	50.0	14.3	28.6

No. of questionnaires tabulated - 15

TABLE 6

SUMMARY OF EMPLOYERS RESPONSE TO GENERAL EDUCATION ABILITIES NEEDED BY THE TECHNICIAN IN RURAL RECREATION

Abilities	Very Important	Important	Of Some Importance	Unimportant
	%	%	%	%
Communication skills:				
Speech	68.8	25.0	06.3	0.0
English composition	50.0	43.8	06.3	0.0
Reading	50.0	43.8	06.3	0.0
Mathematics Skills:				
Applied arithmetic	37.5	50.0	12.5	0.0
Elementary algebra	06.3	18.8	56.3	18.8
Advanced algebra	06.3	06.3	37.5	50.0
Plane Geometry	06.3	25.0	37.5	31.3
Trigonometry	06.3	12.5	31.3	50.0
Science skills:				
Biology, general	12.5	50.0	25.0	12.5
Botany, general	25.0	37.5	25.0	12.5
Zoology, general	06.3	56.3	18.8	18.8
Other skills:				
Electricity	25.0	31.3	43.8	0.0
Technical drawings	12.5	56.3	31.3	0.0
Typing, personal	25.0	50.0	18.8	06.3
Accounting	18.8	37.5	43.8	0.0
Personnel management	56.3	25.0	06.3	12.5
Economics	12.5	37.5	37.5	0.0

No. of questionnaires tabulated - 20

TABLE 7

SUMMARY OF EMPLOYERS RESPONSE TO GENERAL EDUCATION ABILITIES NEEDED BY THE TECHNICIAN IN WILDLIFE MANAGEMENT

Abilities	Very Important	Important	Of Some Importance	Unimportant
	%	%	%	%
Communication skills:				
Speech	66.7	20.0	06.7	06.7
English composition	46.7	33.3	13.3	06.7
Reading	66.7	26.7	0.0	06.7
Mathematics skills:				
Applied arithmetic	13.3	60.0	13.3	13.3
Elementary algebra	0.0	20.0	46.7	33.3
Advanced algebra	0.0	0.0	33.3	66.7
Plane geometry	0.0	06.7	53.3	40.0
Trigonometry	0.0	06.7	20.0	73.3
Science skills:				
Biology, general	46.7	33.3	13.3	06.7
Botany, general	40.0	40.0	06.7	13.3
Zoology, general	33.3	46.7	13.3	06.7
Other skills:				
Electricity	0.0	13.3	46.7	40.0
Technical drawings	06.7	60.0	20.0	13.3
Typing, personal	0.0	53.3	33.3	13.3
Accounting	0.0	20.0	53.3	26.7
Personnel management	13.3	40.0	40.0	06.7
Economics	06.7	0.0	46.7	46.7

No. of questionnaires tabulated - 17

TABLE 8

PERCENTAGE OF EMPLOYERS RESPONSE TO THE ABILITIES NEEDED BY TECHNICIANS WORKING IN FORESTRY

(VI) 75 - 100% = Very Important
(I) 50 - 74% = Important
(SI) 25 - 49% = Of Some Importance
(U) 0 - 24% = Unimportant

ABILITIES	% rated as	VI	I	SI	U
1.	Know game laws and regulations.	0.0	21.4	28.6	50.0
2.	Construction of small dams and ponds.	07.1	14.3	42.9	35.7
3.	Weed control in ponds and streams.	0.0	07.1	28.6	64.3
4.	Identification of fish.	07.1	07.1	07.1	78.6
5.	Identification of water fowl.	07.1	07.1	07.1	78.6
6.	Identification of big game.	07.1	07.1	21.4	64.3
7.	Identification of fur bearers.	07.1	07.1	14.3	71.4
8.	Identification of upland game.	07.1	14.3	14.3	64.3
9.	Determine carrying capacity of ponds and lakes.	07.1	07.1	07.1	78.6
10.	Care and diseases of fish.	0.0	0.0	14.3	85.7
11.	Care and diseases of game birds	0.0	0.0	21.4	78.6
12.	Proper rations for fish.	0.0	07.1	07.1	85.7
13.	Proper rations for game birds.	0.0	07.1	21.4	71.4
14.	Pollution protection.	0.0	35.7	28.6	35.7
15.	Inventory fish and wildlife resources.	14.3	07.1	14.3	64.3
16.	Netting and tagging.	0.0	07.1	07.1	85.7
17.	Planning and choosing a site for ponds.	0.0	07.1	28.6	64.3
18.	Measure flow of water in streams	0.0	21.4	28.6	50.0
19.	Ability to operate trucks and equipment.	64.3	21.4	07.1	07.1
20.	Building of structures and facilities.	21.4	42.9	14.3	21.4
21.	Recreation planning.	07.1	21.4	21.4	50.0

Table 8 - Forestry Abilities % rated as	VI	I	SI	U
22. Laws & regulations relating to recreation.	0.0	21.4	35.7	42.9
23. Evaluation of hazards (trees).	14.3	35.7	28.6	21.4
24. Pruning of trees and shrubs.	0.0	28.6	35.7	35.7
25. Control of plant pests and diseases.	07.1	57.1	21.4	14.3
26. Weed control.	07.1	14.3	42.9	35.7
27. Landscape design.	0.0	07.1	21.4	71.4
28. Maintenance - painting, plumbing, carpentry.	21.4	28.6	28.6	21.4
29. Fire control.	35.7	50.0	14.3	0.0
30. Identification of tree species.	42.9	50.0	07.1	0.0
31. Identification of brush.	42.9	28.6	21.4	07.1
32. Know grades of logs and lumber.	50.0	28.6	07.1	14.3
33. Timber marking.	35.7	35.7	14.3	14.3
34. Repair and maintenance of pumps.	21.4	21.4	21.4	35.7
35. Determine weather conditions.	14.3	28.6	28.6	28.6
36. Be familiar with Forest Practice Act.	21.4	28.6	28.6	28.6
37. Cruise timber.	35.7	21.4	28.6	14.3
38. Scale logs.	21.4	42.9	28.6	07.1
39. Knowledge of logging operation.	28.6	50.0	21.4	0.0
40. Timber thinning.	28.6	28.6	21.4	21.4
41. Ability to evaluate soil conditions.	0.0	78.6	14.3	07.1
42. Basic mechanics - use of common hand and power tools for wood, metal, concrete, paint, and rope work.	35.7	21.4	35.7	07.1
43. Safety.	71.4	28.6	0.0	0.0
44. Surveying - use of surveying instruments and equipment for measurement, layout and mapping.	28.6	64.3	07.1	0.0
45. Irrigation and drainage - principles, systems, installations, equipment, devices.	0.0	42.9	21.4	35.7
46. Soil and water conservation - soil mapping and control, water supply and control, soil and water reclamation	07.1	28.6	42.9	21.4

TABLE 9

PERCENTAGE OF EMPLOYERS RESPONSE TO THE ABILITIES NEEDED BY TECHNICIANS WORKING IN RURAL RECREATION

(VI) 75 - 100% = Very Important
(I) 50 - 74% = Important
(SI) 25 - 49% = Of Some Importance
(U) 0 - 24% - Unimportant

ABILITIES	% rated as	VI	I	SI	U
1.	Know game laws and regulations.	18.8	43.8	18.8	18.8
2.	Construction of small dams and ponds.	0.0	37.5	12.5	50.0
3.	Weed control in ponds and streams.	06.3	31.3	25.0	37.5
4.	Identification of fish.	12.5	18.8	50.0	18.8
5.	Identification of water fowl.	06.3	18.8	43.8	31.3
6.	Identification of big game.	06.3	06.3	43.8	43.8
7.	Identification of fur bearers.	06.3	06.3	50.0	37.5
8.	Identification of upland game.	06.3	06.3	37.5	50.0
9.	Determine carrying capacity of ponds and lakes.	06.3	18.8	25.0	50.0
10.	Care and diseases of fish.	0.0	12.5	18.8	68.8
11.	Care and diseases of game birds.	0.0	12.5	0.0	87.5
12.	Proper rations for fish.	0.0	06.3	12.5	81.3
13.	Proper rations for game birds.	0.0	06.3	06.3	87.5
14.	Pollution protection.	18.8	31.3	18.8	31.3
15.	Inventory fish and wildlife resources.	06.3	12.5	31.3	56.3
16.	Netting and tagging.	0.0	18.8	0.0	81.3
17.	Planning and choosing a site for ponds.	0.0	18.8	25.0	56.3
18.	Measure flow of water in streams.	12.5	06.3	31.3	50.0
19.	Ability to operate trucks and equipment.	68.8	18.8	06.3	06.3
20.	Building of structures and facilities.	43.8	37.5	18.8	0.0
21.	Recreation planning.	43.8	37.5	18.8	0.0
22.	Laws and regulations relating to recreation	37.5	43.8	06.3	12.5

Table 9 - Rural Recreation Abilities, % rated as	VI	I	SI	U
23. Evaluation of hazards (trees).	56.3	37.5	06.3	0.0
24. Pruning of trees and shrubs	43.8	18.8	25.0	12.5
25. Control of plant pests and diseases.	37.5	43.8	12.5	12.5
26. Weed control.	25.0	37.5	31.3	06.3
27. Landscape design.	25.0	25.0	37.5	12.5
28. Maintenance - painting, plumbing, carpentry.	56.3	43.8	0.0	0.0
29. Fire control.	50.0	43.8	06.3	0.0
30. Identification of tree species.	18.8	50.0	18.8	12.5
31. Identification of brush.	12.5	50.0	18.8	18.8
32. Know grades of logs and lumber.	06.3	12.5	18.8	62.5
33. Timber marking.	0.0	0.0	25.0	75.0
34. Repair and maintenance of pumps.	18.8	56.3	12.5	12.5
35. Determine weather conditions	12.5	25.0	50.0	12.5
36. Be familiar with Forest Practice Act.	06.3	12.5	25.0	56.3
37. Cruise Timber.	0.0	0.0	18.8	81.3
38. Scale logs.	0.0	0.0	25.0	75.0
39. Knowledge of logging operation.	0.0	0.0	31.3	68.8
40. Timber thinning.	0.0	0.0	43.8	56.3
41. Ability to evaluate soil conditions.	31.3	18.8	31.3	18.8
42. Basic mechanics - use of common hand and power tools for wood, metal, concrete, paint, and rope work.	56.3	37.5	06.3	0.0
43. Safety	93.8	06.3	0.0	0.0
44. Surveying - use of surveying instruments and equipment for measurement, layout and mapping.	06.3	62.5	18.8	12.5
45. Irrigation and drainage - principles, systems, installations, equipment devices.	31.3	25.0	37.5	06.3
46. Soil and water conservation - soil mapping and control, water supply and control, soil and water reclamation.	37.5	06.3	37.5	18.8

TABLE 10

PERCENTAGE OF EMPLOYERS RESPONSE TO THE ABILITIES NEEDED BY TECHNICIANS WORKING IN WILDLIFE MANAGEMENT

(VI) 75 - 100% = Very Important
(I) 50 - 74% = Important
(SI) 25 - 49% = Of Some Importance
(U) 0 - 24% = Unimportant

ABILITIES	% rated as	VI	I	SI	U
1.	Know game laws and regulations.	66.7	33.3	0.0	0.0
2.	Construction of small dams and ponds.	13.3	20.0	53.3	13.3
3.	Weed control in ponds and streams.	13.3	33.3	40.0	13.3
4.	Identification of fish.	40.0	26.7	20.0	13.3
5.	Identification of water fowl.	53.3	20.0	13.3	13.3
6.	Identification of big game.	40.0	20.0	20.0	20.0
7.	Identification of fur bearers.	40.0	26.7	13.3	20.0
8.	Identification of upland game.	53.3	20.0	13.3	13.3
9.	Determine carrying capacity of ponds and lakes.	13.3	26.7	46.7	13.3
10.	Care and diseases of fish.	20.0	20.0	33.3	26.7
11.	Care and diseases of game birds.	20.0	46.7	20.0	13.3
12.	Proper rations for fish.	13.3	20.0	26.7	40.0
13.	Proper rations for game birds.	20.0	33.3	26.7	20.0
14.	Pollution protection.	33.3	26.7	26.7	13.3
15.	Inventory fish and wildlife resources.	33.3	40.0	20.0	06.7
16.	Netting and tagging.	13.3	33.3	33.3	20.0
17.	Planning and choosing a site for ponds.	13.3	26.7	33.3	26.7
18.	Measure flow of water in streams.	0.0	40.0	33.3	26.7
19.	Ability to operate trucks and equipment.	20.0	33.3	46.7	0.0
20.	Building of structures and facilities.	13.3	13.3	46.7	26.7
21.	Recreation planning.	0.0	26.7	60.0	13.3

Table 10 - Wildlife Management Abilities

	% rated as	VI	I	SI	U
22.	Laws and regulations relating to recreation.	13.3	33.3	40.0	13.3
23.	Evaluation of hazards (trees).	13.3	06.7	53.3	26.7
24.	Pruning of trees and shrubs.	0.0	06.7	40.0	53.3
25.	Control of plant pests and diseases.	06.7	20.0	33.3	40.0
26.	Weed control.	06.7	13.3	60.0	20.0
27.	Landscape design.	0.0	13.3	20.0	66.7
28.	Maintenance - painting, plumbing, carpentry.	20.0	13.3	26.7	40.0
29.	Fire control.	13.3	06.7	53.3	26.7
30.	Identification of tree species.	06.7	53.3	20.0	20.0
31.	Identification of brush.	26.7	33.3	20.0	20.0
32.	Know grades of logs and lumber.	0.0	06.7	20.0	73.3
33.	Timber marking.	0.0	06.7	06.7	86.7
34.	Repair and maintenance of pumps.	20.0	06.7	33.3	40.0
35.	Determine weather conditions.	06.7	26.7	40.0	26.7
36.	Be familiar with Forest Practice Act.	0.0	20.0	46.7	33.3
37.	Cruise timber.	0.0	06.7	06.7	86.7
38.	Scale logs.	0.0	06.7	06.7	86.7
39.	Knowledge of logging operation.	0.0	20.0	26.7	53.3
40.	Timber thinning.	0.0	06.7	20.0	73.3
41.	Ability to evaluate soil conditions.	13.3	26.7	40.0	20.0
42.	Basic mechanics - use of common hand and power tools for wood, metal, concrete, paint, and rope work.	20.0	33.3	40.0	06.7
43.	Safety.	66.7	26.7	0.0	06.7
44.	Surveying - use of surveying instruments and equipment for measurement, layout and mapping.	13.3	26.7	40.0	20.0
45.	Irrigation & drainage - principles, systems, installations, equipment, devices.	13.3	26.7	40.0	13.3
46.	Soil and water conservation - soil mapping and control, water supply and control, soil & water reclamation.	13.3	46.7	20.0	20.0

TABLE 11

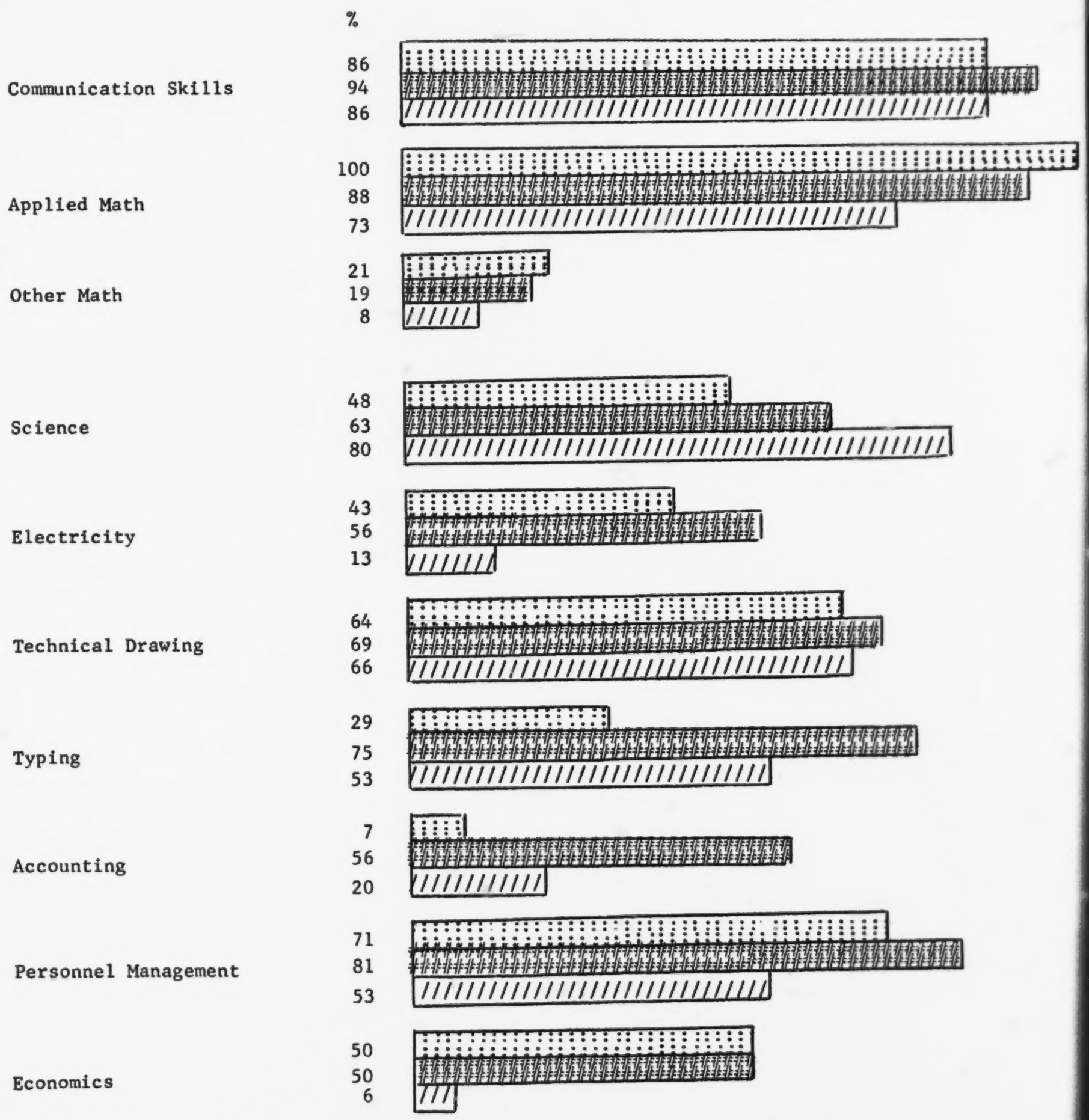
COMPARISON OF GENERAL EDUCATION ABILITIES IN FORESTRY, RURAL RECREATION AND WILDLIFE MANAGEMENT

Forestry

Rural Recreation

Wildlife Management

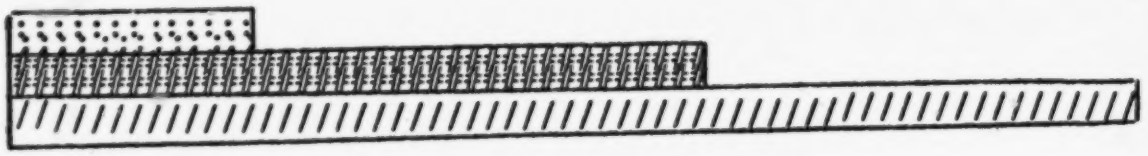
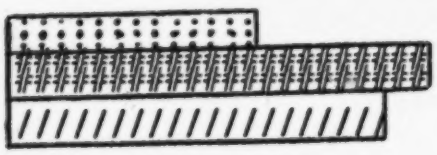
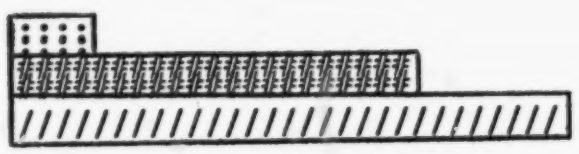
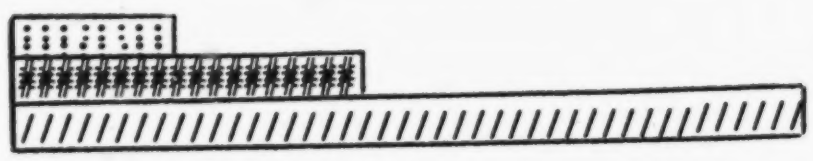
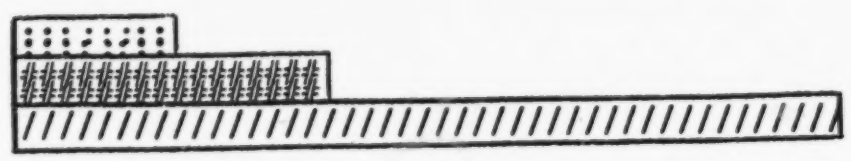
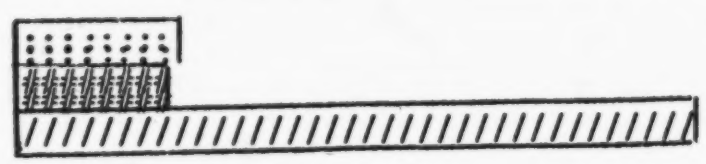
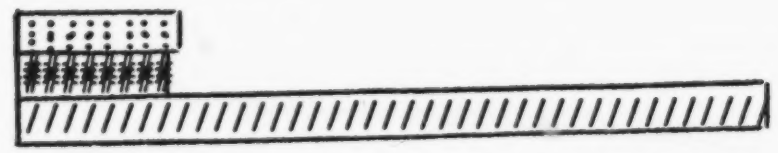
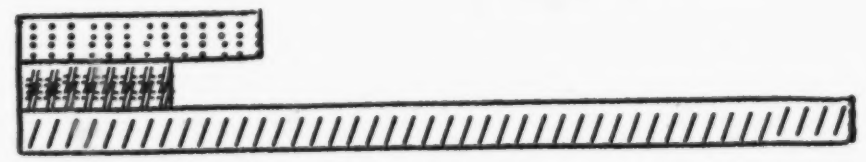
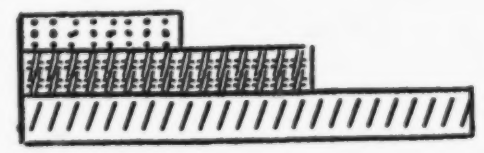
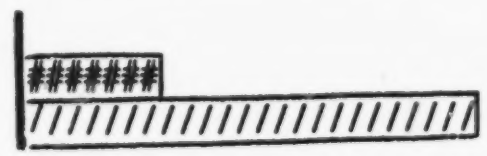
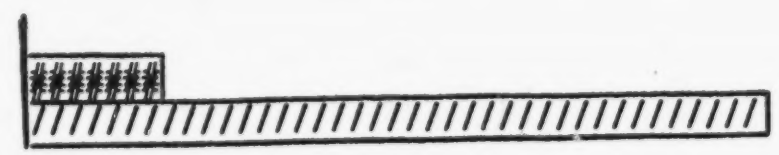
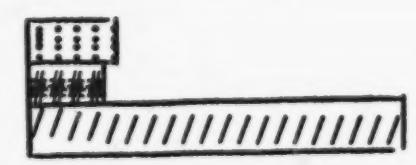
75 - 100% = Very Important
50 - 74% = Important
25 - 49% = Of Some Importance
0 - 24% - Unimportant



Percentage figures rated by employers as being very important and important.

TABLE 12

COMPARISON OF SKILLS IN FORESTRY, RURAL RECREATION AND WILDLIFE MANAGEMENT

	%	
1. Know game laws and regulations.	21 62 100	
2. Construction of small dams and ponds.	21 38 33	
3. Weed control in ponds and streams	7 38 47	
4. Identification of fish.	14 31 67	
5. Identification of water fowl.	14 27 73	
6. Identification of big game.	14 13 60	
7. Identification of fur bearers.	14 13 67	
8. Identification of upland game	21 13 73	
9. Determine carrying capacity of ponds and lakes.	14 25 40	
10. Care and diseases of fish.	0 12 40	
11. Care and diseases of game birds.	0 12 67	
12. Proper rations for fish.	7 6 33	

Percentage figures rated by employers as being very important and important.

Table 12

	%
13. Proper rations for game birds	7 6 53
14. Pollution protection.	36 50 60
15. Inventory fish and wildlife resources	21 19 73
16. Netting and tagging.	7 19 47
17. Planning and choosing a site for ponds.	7 19 40
18. Measure flow of water in stream.	21 19 40
19. Ability to operate trucks and equipment.	86 88 53
20. Building of structures and facilities.	64 81 27
21. Recreation planning.	28 81 27
22. Laws and regulations relating to recreation.	21 81 47
23. Evaluation of hazards (trees).	50 93 20
24. Pruning of trees and shrubs.	29 63 7

Table 12

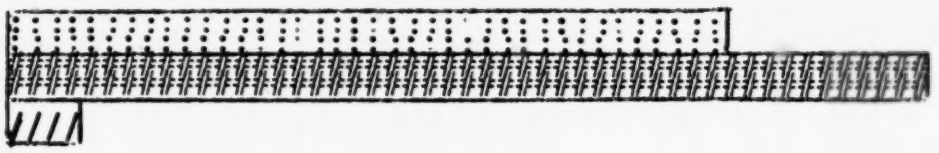
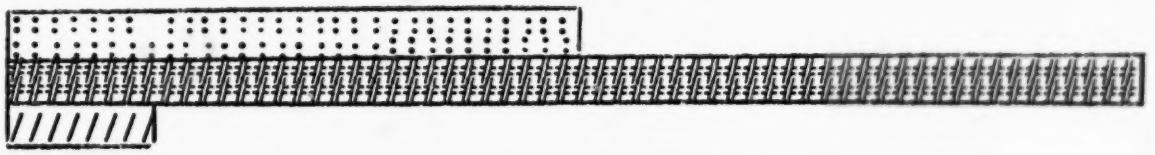
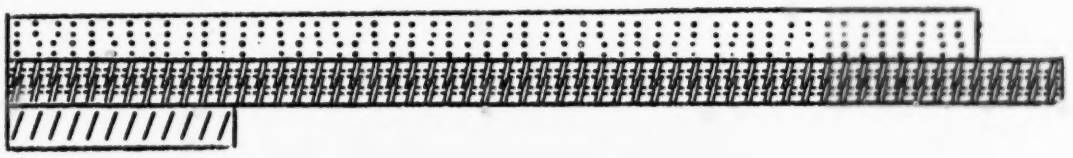
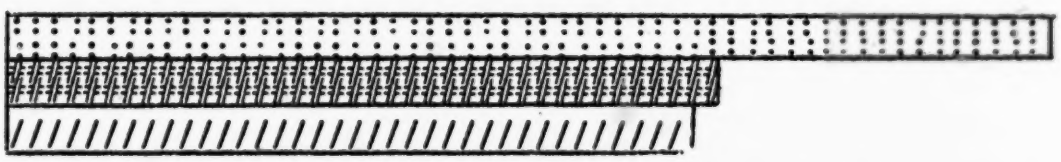
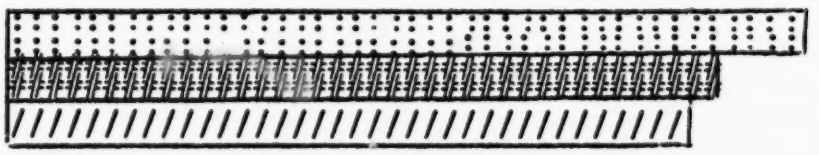
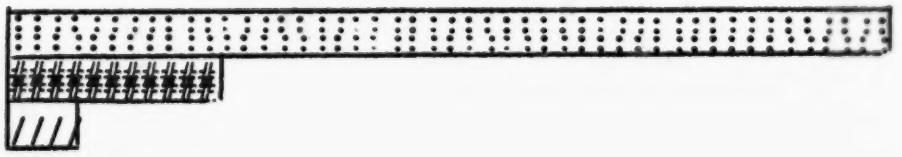
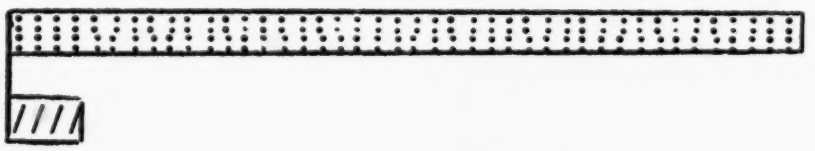
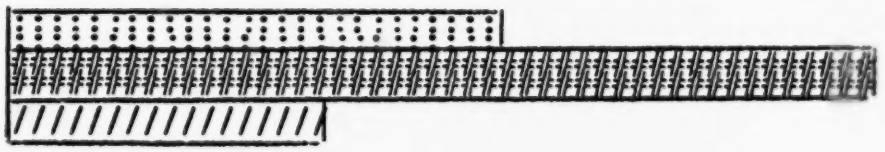
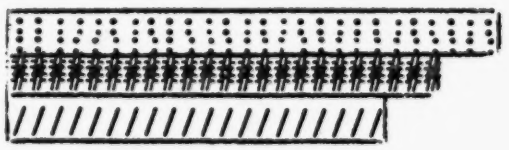
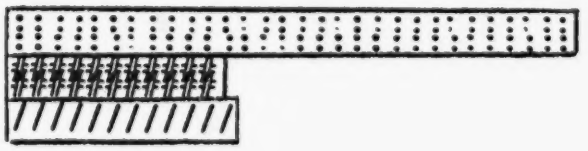
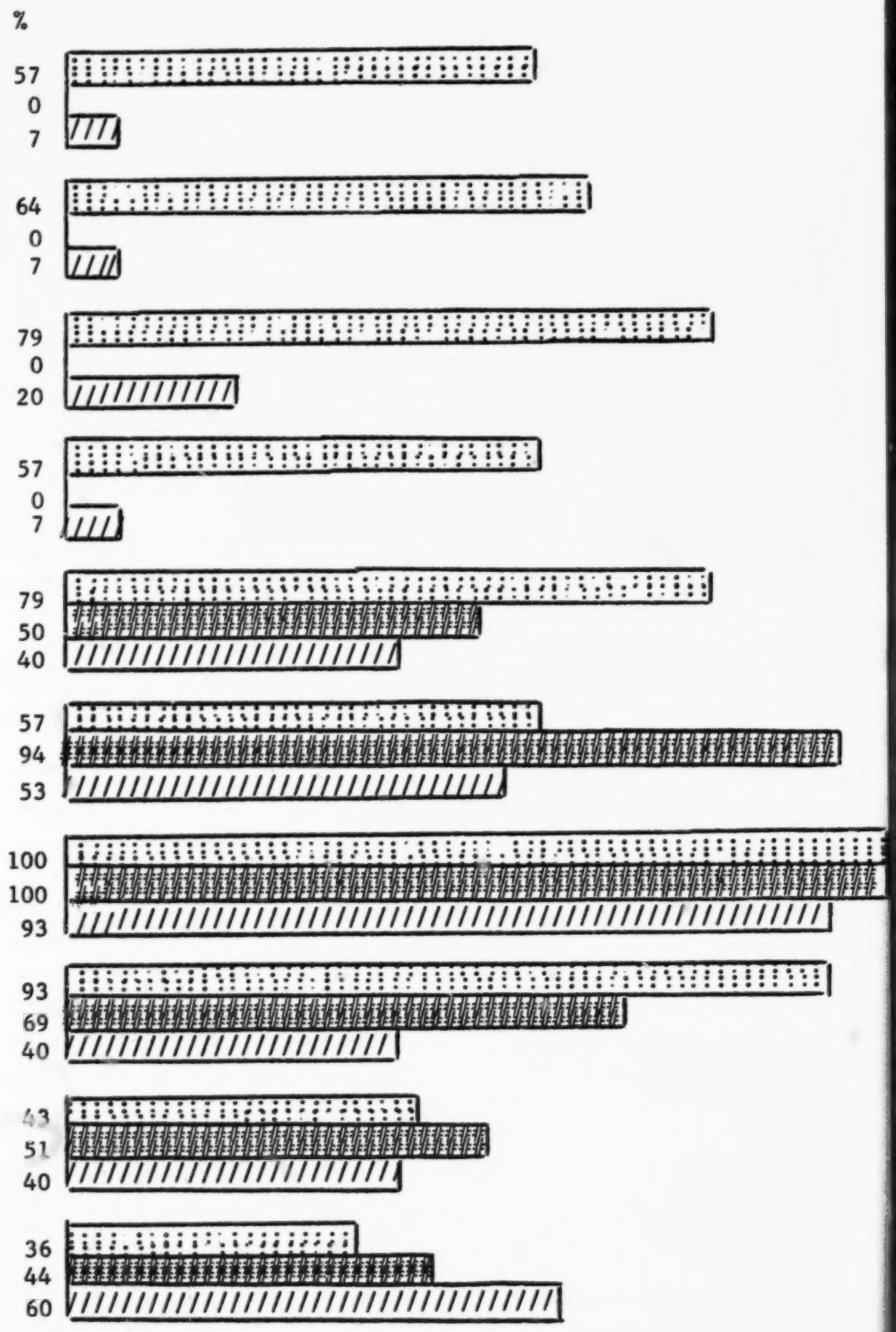
	%	
25. Control of plant pests and diseases.	64 81 7	
26. Weed control.	21 63 27	
27. Landscape design.	7 50 20	
28. Maintenance - painting, plumbing, carpentry.	50 100 13	
29. Fire control.	86 94 20	
30. Identification of tree species.	93 63 60	
31. Identification of brush.	72 63 60	
32. Know grades of logs and lumber	79 19 7	
33. Timber marking.	71 0 7	
34. Repair and maintenance of pumps.	43 75 27	
35. Determine weather conditions.	43 38 33	
36. Be familiar with Forest Practice Act.	50 19 20	

Table 12


%
37. Cruise Timber
57
0
7
38. Scale logs.
64
0
7
39. Knowledge of logging operation.
79
0
20
40. Timber thinning.
57
0
7
41. Ability to evaluate soil conditions.
79
50
40
42. Basic mechanics - use of common hand & power tools for wood, metal, concrete, paint & rope work.
57
94
53
43. Safety
100
100
93
44. Surveying - use of surveying instruments and equipment for measurement, layout, mapping.
93
69
40
45. Irrigation & drainage - principles, systems installations, equipment, devices.
43
51
40
46. Soil & water conservation - soil mapping & control, water supply & control, soil & water reclamation.
36
44
60

COMMENTS ON RETURNED QUESTIONNAIRE

"The inclusion of a course that covers Recreation, Wildlife Management, and Range Management at the junior college level will benefit all students interested in the various phases of land, water and animal management. Of course, this class will deal with fundamental principles and not too technical procedures. As an individual trained in wildlife management, I will be more than happy to help you in any way. I congratulate you on your ideas and your desire to help the young students in this field. I do hope this course becomes a reality because it will benefit all those who take this course in their future ideas and plans."

(Wildlife Manager)

"In the future we want to hire only junior college graduates for foreman jobs in the park, forestry and recreation areas. Every man must be able to build, supervise, and handle people."

(County Parks Superintendent)

"Most persons who are seeking careers in the wildlife management field, but who lack a degree in appropriate fields, are employed in the Fish and Game Assistant classification. Approximately 20 positions in this classification are filled each year."

(Department of Fish and Game)

"We will accept any college degree as qualification for our professional entry class State Park Ranger I."

(Department of Parks and Recreation)

"I am sure the questionnaire will be of assistance to you in developing an adequate instruction program at the junior college level."

(Department of Fish and Game
Regional Manager)

"Please feel free to contact me and I'll do my best to help you and your worthwhile cause."

(Game Manager)

"I believe your questionnaire was very thorough and complete."

(State Forest Ranger)

CONCLUSIONS - RECOMMENDATIONS

The conclusions and recommendations are those derived from the information acquired through the questionnaire and by personal interview of personnel surveyed. The following basic questions were the primary objectives, and will be answered from the information obtained.

What are the needs in both the private and public sectors of the economy as to employment and opportunities?

There is a very definite need in both the private and public sectors for people trained at the technical, skilled and semi-skilled level for the forestry, rural recreation and wildlife management fields. The anticipated employment in forestry in 1970 at the professional level is 64, at the technical level 209-219, and at the skilled and semi-skilled level it is 65-90. Anticipated employment in rural recreation the same year at the professional level is 8, technical level, 72-82, skilled and semi-skilled, 40. Wildlife management anticipated employment in 1970 at the three levels is as follows: professional 30, technical 20, and skilled and semi-skilled 31. With the development of a curriculum at the junior college level, many students wanting to enter these fields as their vocation will be better prepared to do so. From the information obtained on the Labor Force Information Sheet of the questionnaire, all levels of occupational employment have placement opportunities. The greatest opportunities, however, were at the technical, skilled and semi-skilled levels. Some agencies and personnel contacted did not have data of future employment opportunities available, but indicated an "excellent opportunity" at all three levels. Others indicated a "steady need" or a "great need" at the technical level. The area which showed the least employment opportunity for people below the professional level was the wildlife management; in all probability this is due to the fact that full time employment at the private sector has not been developed to the extent of those in forestry and recreation. However, the project director feels that with predictions and trends for the demand for fishing and hunting in California, the natural fish and game supplies at present will not support this demand in the future. Therefore, within recreation, fish and game is probably an area of growth. More fish and game will have to be raised, stocked or planted to meet this demand. Indications of the survey in the private sector of the fish and game area were that these people are concerned with the total recreation. On fish farms where stocking fish are raised for sales, picnic areas and other recreational facilities for family outings need to be provided also.

What are the levels and kinds of training required to prepare for such employment?

As pointed out previously, the greatest need indicated was for people entering these fields at the technical level. There is also a great demand for people trained at the skilled and semi-skilled levels.

In general education, certain subject matter abilities were common to forestry, recreation and wildlife management. The ability to communicate by speaking, reading, and writing was rated very high by all three. Mathematics, in general, was rated low. However, the ability to use basic arithmetic was rated very high in all fields for people at the technical level.

Technical drawings, sketching, and reading maps or blueprints were rated high in all areas. Personnel management was rated high to very high in all areas.

The general science area as covered in the questionnaire is of some importance in forestry, while it is important in recreation and very important in fish and game. The specific skills and abilities for forestry, recreation and wildlife management are shown in table 12. The correlation of skills and training needed between the areas is shown in table 11.

Does there exist a core of instructional material common to these and other areas?

In relation to the type of training, there are subject areas common to the three fields. This is particularly true in some of the general education subjects. Specific skills with a high correlation between all areas are:

1. Water pollution
2. Operation of trucks and equipment
3. Fire control
4. Identification of trees
5. Identification of brush
6. Ability to evaluate soil conditions
7. Basic Mechanics
8. Safety
9. Surveying

Some skills had a high correlation between two fields and very little correlation with the third. Reference to these common skills between areas should be made in tables 11 and 12. Various people surveyed at the public level felt that certain abilities were not as necessary for the technical employee because there is the professionally trained person to make decisions and to do the planning. Examples of this would be in landscape design, or the planning and choosing of a site for ponds. However, it is felt that as the needs for both public and private facilities increase, there will be an increased need for people to have some of these skills which were rated as "of some importance." Employers in private enterprise will not have the services of a full staff for all types of problems and decisions which will have to be met. The technical, skilled and semi-skilled employers are the ones in the field who should have the abilities to recognize a problem when it exists. They should also be able to recognize a potential recreation area, with further and final planning being done by the professional.

What is the extent of present facilities and needs in our junior college area relative to the area of natural resources?

The greatest employment opportunities and needs are located in our foothill and mountain regions. Forestry and recreation are the basic economy for the Mother Lode counties. There is also a definite need for trained personnel in the San Joaquin and Sacramento valleys. This is due to private industry in the field of forestry now existing in the valley. An example of this is in the wood products industry with a firm such as Stockton Box Company. It has been found that the greatest demand for recreational facilities is within a 60 mile radius of the population center. Most of our recreation is water orientated. Where there is water, there is at least a potential recreation area. It has been pointed out by both private and public sectors that campgrounds, picnic grounds, and other recreational facilities are filled to capacity during most of the season. Generally, the private sector, in both recreation and wildlife management, is lacking. An example of this is brought out by the distribution of camp units in California by agencies.

U.S. Forest Service	12,042	units
U.S. National Park Service	5,447	"
State Beaches and Parks	3,040	"
Counties	3,393	"
Cities	381	"
Recreation Districts	251	"
Private and Commercial	4,514	" (1)

The number of private fish farms is limited in the junior college district. Only one fish farm was found to be self-supporting. The other fish farms were run as a supplement to the owners' employment elsewhere. This can be an additional crop of the land. None of these farms were hiring any employees at the present time. Hunting clubs and hunting preserves are usually carried on in conjunction with some other enterprise.

What is the possibility of technician level training in the resource management areas?

The possibility of instruction offered at the junior college level to better prepare for entry into these fields is very good. With the facilities and course offerings of the junior college it is felt that students can receive basic fundamental subject matter. The junior college has a number of the essential course offerings to prepare the students at the technical level. Examples of these are in the general education subject area. Other specific skills needed are found in agriculture courses, such as surveying, plant identification, basic mechanics, soils, irrigation and drainage, tractors and equipment. The essential courses are lacking to prepare students in the specific skills and knowledge needed in forestry, recreation and wildlife management. It must be remembered that not all students completing a resource management curriculum will, or should, enter positions at the technical level. Some jobs will require on the job training. However, with the basic and fundamental skills, these positions will be reached sooner.

Recommendations

After review of the Labor Force Information and the skills and abilities needed for technical, skilled and semi-skilled employment, the following recommendations are made:

1. An additional course be offered in forest production to supplement the present introductory forestry course. This would give more depth to some areas already being taught, and offer instruction in areas not presently being covered. Examples of this are in wood products where it was pointed out that there is a real need for young people. Otner areas included control of plant pests and diseases, timber marking, knowledge of logging operations, and familiarity with California's Forest Practice Act.

2. The offering of one course in resource planning and development. This would include areas such as recreational structures and facilities, planning and design, laws and regulations relating to safety, hazards in recreational areas, sanitation and maintenance.

(1) California Public Outdoor Recreation Plan, Part II, Page 39.

3. The offering of one course in wildlife production to cover the specific areas related to providing facilities for hunting and fishing. Game laws and regulations, weed control in ponds, identification of wildlife, care of and diseases of wildlife, inventory processes, netting and tagging wildlife, feeding and raising game, and breeding seasons of wildlife would be included in such a course.

The three recommended courses would be technical courses and would be taken after completion of the basic fundamental subjects.

APPENDIX

MODESTO JUNIOR COLLEGE

Modesto, California

Dear Sir:

In desiring to keep pace with our fast changing society and the additional training required by the various related fields in agriculture, Modesto Junior College has conducted two studies in the past. From these studies, programs have been developed to train students at the technician level in the fields of ornamental horticulture, animal husbandry and agricultural engineering. Due to the increasing demands on our state's natural resources, this present study is being conducted at the Modesto Junior College with funds supported by the Vocational Education Act of 1963.

An attempt is being made to determine the necessary skills, abilities, and employment opportunities in the fields of wildlife management, rural recreation and forestry. This is being done with the intention that if employment needs exist for persons trained in these areas, adequate instructional programs at the junior college level can be developed. The technician is one who is trained to handle intermediate responsibilities, between those appropriate to the semi-skilled worker and those of the professional.

As you are in a responsible position in the natural resource field, you are therefore among the best qualified to assist in determining the employment and training needs of these workers. Your cooperation in helping us to obtain information essential to our educational program will be greatly appreciated.

Sincerely,

HAROLD C. WHALEY
Project Director

HCW:vt

EMPLOYER'S QUESTIONNAIRE

CONSERVATION MANAGEMENT OF

WILDLIFE, FORESTRY AND RECREATION

GENERAL INFORMATION

Name: _____

Address: _____

Organization: _____

Position in Organization:

a. Owner _____

b. Owner-Manager _____

c. Manager - hired _____

d. Other (specify) _____

SECTION I

GUIDE FOR THE CLASSIFICATION OF PERSONNEL ACCORDING TO THE LEVEL OF OCCUPATIONAL PREPARATION

Professional Level: That preparation and/or experience for occupations requiring a high degree of mental activity. Generally requires an academic background of four years of formal education in organized courses concerned with theoretical and practical aspects of complex fields of human endeavor. Examples include: engineers, plant pathologists, forest rangers, park rangers.

Technical Level: That preparation and/or experience for occupations requiring both know-why and know-how abilities, theoretical and practical understandings, and a high level of job competence. Preparation normally acquired in post-high school training programs. Generally considered a semi-professional preparation to prepare persons to bridge the gap between skilled workers and professional personnel. Examples include: surveyor aids, engineering technicians, fire fighter foremen, and fish hatchery foremen.

Skilled and Semi-Skilled Level: That preparation and/or experience for occupations that require manual skills, knowledge of work processes, exercise of manipulative ability of fairly high order, but limited to a fairly well defined work routine. Examples include: equipment operators, fire fighters.

LABOR FORCE INFORMATION

Level of Occupational Preparation	Total Number Employed Last Year-'64		Approximate Entry Salary	Examples of Job Titles For Each Level of Preparation	No. of Placement Opportunities Anticipated			
					1965		1970	
	Full Time	Part Time*			Full Time	Part Time	Full Time	Part Time
PROFESSIONAL				a. _____ b. _____ c. _____ d. _____				
TECHNICAL				a. _____ b. _____ c. _____ d. _____				
SKILLED and SEMI-SKILLED				a. _____ b. _____ c. _____ d. _____				

* Consider a part-time employee as one working 6 months or less.

SECTION II

This section lists subject areas which might be offered in a junior college technical training program for the qualification of fish and game, rural recreation and forestry workers. Rate each listing according to the importance which the content of the subject matter area contributes to the acquisition of knowledge and the development of understandings, skills, and abilities essential to the satisfactory preparation of highly skilled workers such as the one you are now considering.

Rate Each Subject Matter Area to Indicate

X	VI	VERY IMPORTANT: Worker regularly uses content of subject matter area.
X	I	IMPORTANT: Worker often uses content of subject matter area.
X	SI	OF SOME IMPORTANCE: Worker sometimes uses content of subject matter area.
X	U	UNIMPORTANT: Worker does not use content of subject matter area.

A. GENERAL EDUCATION AREAS

___VI___I___SI___U	1. COMMUNICATION SKILLS: SPEECH - Public Speaking and informal, face-to-face type discussion.
___VI___I___SI___U	2. COMMUNICATION SKILLS: ENGLISH COMPOSITION - Writing business letters, reports, directions, specifications and instructions.
___VI___I___SI___U	3. COMMUNICATION SKILLS: READING - Interpreting instructions, technical bulletins and texts.
___VI___I___SI___U	4. APPLIED ARITHMETIC - Measurements and computations of agricultural problems using arithmetic techniques (decimals, fractions, per cent, ratio and proportion, equations).
___VI___I___SI___U	5. ELEMENTARY ALGEBRA - Introduction to the use of letters, signs of operation and symbols in treating relations and properties of numbers.
___VI___I___SI___U	6. ADVANCED ALGEBRA - Quadratic equations, variations, progressions, and binomial theorem.
___VI___I___SI___U	7. PLANE GEOMETRY - An introduction to the study of the relations, properties, and measurement of surfaces, lines, and angles.
___VI___I___SI___U	8. TRIGONOMETRY - The relations which hold among the sides and angles of triangles.

A. GENERAL EDUCATION AREAS (Cont.)

____VI____I____SI____U 9. ELECTRICITY - Fundamental principles, systems, circuits, equipment and devices.

____VI____I____SI____U 10. TECHNICAL DRAWINGS - Sketches, diagrams, maps, outlines, graphs, charts, cross-section and blueprints.

____VI____I____SI____U 11. BIOLOGY, GENERAL - Introduction to the major principles, concepts, and methods of the life sciences.

____VI____I____SI____U 12. BOTANY, GENERAL - A comprehensive view of the plant kingdom.

____VI____I____SI____U 13. ZOOLOGY, GENERAL - A comprehensive view of the animal kingdom.

____VI____I____SI____U 14. TYPING, PERSONAL - Letter writing, manuscripts, reports and tabulations.

____VI____I____SI____U 15. ACCOUNTING - Entry systems, ledgers, journals, business forms, statements and adjustments.

____VI____I____SI____U 16. PERSONNEL MANAGEMENT - The effective utilization of human resources in organization.

____VI____I____SI____U 17. ECONOMICS - INTRODUCTION TO - Functioning of our economy, basic processes and practical applications.

____VI____I____SI____U 18. OTHER (List) _____

_____

B. AREAS OF FISH AND GAME, RURAL RECREATION AND FORESTRY

____VI____I____SI____U 1. Know game laws and regulations.

____VI____I____SI____U 2. Construction of small dams and ponds.

____VI____I____SI____U 3. Weed control in ponds and streams.

____VI____I____SI____U 4. Identification of fish.

____VI____I____SI____U 5. Identification of water fowl.

____VI____I____SI____U 6. Identification of big game.

____VI____I____SI____U 7. Identification of fur bearers.

____VI____I____SI____U 8. Identification of upland game.

____VI____I____SI____U 9. Determine carrying capacity of ponds and lakes.

____VI____I____SI____U 10. Care and diseases of fish.

B. AREAS OF FISH & GAME, RURAL RECREATION AND FORESTRY

____VI____I____SI____U 11. Care and diseases of game birds.

____VI____I____SI____U 12. Proper rations for fish.

____VI____I____SI____U 13. Proper rations for game birds.

____VI____I____SI____U 14. Pollution protection.

____VI____I____SI____U 15. Inventory fish and wildlife resources.

____VI____I____SI____U 16. Netting and tagging.

____VI____I____SI____U 17. Planning and choosing a site for ponds.

____VI____I____SI____U 18. Measure flow of water in streams.

____VI____I____SI____U 19. Ability to operate trucks and equipment.

____VI____I____SI____U 20. Building of structures and facilities.

____VI____I____SI____U 21. Recreation planning.

____VI____I____SI____U 22. Laws and regulations relating to recreation.

____VI____I____SI____U 23. Evaluation of hazards (trees).

____VI____I____SI____U 24. Pruning of trees and shrubs.

____VI____I____SI____U 25. Control of plant pests and diseases.

____VI____I____SI____U 26. Weed control.

____VI____I____SI____U 27. Landscape design.

____VI____I____SI____U 28. Maintenance - painting, plumbing, carpentry.

____VI____I____SI____U 29. Fire control.

____VI____I____SI____U 30. Identification of tree species.

____VI____I____SI____U 31. Identification of brush.

____VI____I____SI____U 32. Know grades of logs and lumber.

____VI____I____SI____U 33. Timber marking.

____VI____I____SI____U 34. Repair and maintenance of pumps.

____VI____I____SI____U 35. Determine weather conditions.

____VI____I____SI____U 36. Be familiar with Forest Practice Act.

____VI____I____SI____U 37. Cruise timber.

B. AREAS OF FISH AND GAME, RURAL RECREATION AND FORESTRY

___VI___I___SI___U	38.	Scale logs.
___VI___I___SI___U	39.	Knowledge of logging operation.
___VI___I___SI___U	40.	Timber thinning.
___VI___I___SI___U	41.	Ability to evaluate soil conditions.
___VI___I___SI___U	42.	Basic mechanics - use of common hand and power tools for wood, metal, concrete, paint, and rope work.
___VI___I___SI___U	43.	Safety.
___VI___I___SI___U	44.	Surveying - use of surveying instruments and equipment for measurement, layout, and mapping.
___VI___I___SI___U	45.	Irrigation and drainage - principles, systems, installations, equipment, devices.
___VI___I___SI___U	46.	Soil and water conservation - soil mapping and control, water supply and control, soil and water reclamation.
___VI___I___SI___U	47.	Other (List) _____
		_____

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
STANISLAUS NATIONAL FOREST
SONORA, CALIFORNIA

October 15, 1965

Mr. E. Tarone
Director - Agriculture Department
Modesto Junior College
Modesto, California

Dear Mr. Tarone:

It was a pleasure to review Mr. Whaley's study pertaining to training needs for technicians in the fields of Forestry, Parks and Wildlife.

The Forest Service needs young men trained for the job of Forestry Technician. This is our largest field of employment and hardest to fill. I feel your proposals will aid the Stanislaus and adjacent National Forests. During the past summer we employed approximately 60 college students plus an additional 30 others in technician positions. I am happy to say that 11 were from Modesto Junior College, 6 in Forestry and 5 in Engineering. Student reports on these men show all but one were average or above in performance.

I would like to suggest that your school increase the number of courses in technician training in the field of Forestry. The three recommendations made in the above report would be helpful. Also, additional courses in Taxonomy (Native plants of California) and Field Biology (identification of native vertebrates and study of their habitat) would be very helpful.

If I can be of any aid to you in further discussions on the matter please do not hesitate to call upon me or my staff.

Sincerely yours,

HARRY D. GRACE
Forest Supervisor

DEPARTMENT OF PUBLIC WORKS

1716 MORGAN ROAD POST OFFICE BOX 3183 PHONE LAMBERT 4-1251, EXT. 621
MODESTO, CALIFORNIA
95353

October 21, 1965

Mr. E. Tarone
Director Dept. Agriculture
Modesto Junior College
Modesto, California

Dear Sir:

After a careful review of the thesis on the three major outdoor recreation fields of Forestry, Rural Recreation, and Fish and Game prepared by Mr. Harold Whaley of your staff, I feel that more qualified men should be enticed into the field. The study group which met on your premises verified my own feelings on this need.

The present curriculum appears to be inadequate to properly prepare men for this field. I would strongly recommend that Modesto Junior College give consideration to adding at least the three courses recommended at the conclusion of the study and review existing courses for possible inclusion of study matter shown to be needed for Recreation majors to assist them in their vocational preparation.

Very truly yours

RICHARD G. BARHITE, Director

By

Richard A. Smith
Parks Superintendent

RAS:am

STATE OF CALIFORNIA—RESOURCES AGENCY

EDMUND G. BROWN, *Governor*

DEPARTMENT OF PARKS AND RECREATION
DIVISION OF BEACHES AND PARKS
4125 WEST LANE
STOCKTON, CALIFORNIA 95204

October 22, 1965

Mr. E. Tarone
Chairman, Agriculture Department
Modesto Junior College
College Avenue
Modesto, California

Dear Mr. Tarone:

I appreciated the opportunity to meet with you and Mr. Whaley and the others present at the recent meeting held on October 14, 1965 at your campus to discuss results of Mr. Whaley's study of the needs for technicians in the natural resources field.

Since that meeting M. M. Whittaker, Assistant Superintendent of Operations in District 3 park units (24 in number), and I have discussed the study results and recommendations. Mr. Whittaker earlier joined with me in answering the questionnaire for the study. He noted that in the outline of course content under recommendation Number Two, no mention is made of operation of park and forest areas. He and I agree that proper emphasis should be placed on the management and operation of forest and park recreation resources. This should cover not only the basic resources and the physical, man-made facilities, but also the handling of people. A high percentage of the time of forest and park personnel is spent in matters dealing with the public; therefore, how the public is accommodated and treated by personnel may make or break the operation. The handling of park employees by supervisors is a highly important part of this picture, and it was dealt with under the heading of personnel management and supervision during the Modesto meeting.

In conclusion we agree with the recommendations to offer three additional courses, one each in the fields of wildlife management, rural recreation, and forest production. We are convinced of the need for technicians with this basic background to manage and operate forest and park resources. We base these views on the expected growth in the number of employees of our own Division of Beaches and Parks which has been estimated at ten per cent per year over the next ten years.

If we can be of further assistance to you in any way please feel free to contact us.

Sincerely yours,

Peter Gaidula
Assistant Landscape Architect
District 3

STATE OF CALIFORNIA--RESOURCES AGENCY EDMUND G. BROWN, Governor

DEPARTMENT OF PARKS AND RECREATION
DIVISION OF BEACHES AND PARKS

CASWELL MEMORIAL STATE PARK
October 15, 1965

Mr. E. Tarone
Agriculture Department
Modesto Jr. College
Modesto, California

Dear Mr. Tarone:

Since I was one of the men selected by Mr. Harold Whaley to assist with the Employer's Questionnaire for studies of a new program to be used at the Modesto Junior College, I have found that the questionnaire covered most of the skills, and abilities essential to the satisfactory preparation of highly skilled workers.

I am sure Mr. Whaley had a very good chance to go over all of these questionnaires and can arrive at what is the need of a program in Modesto Junior College that would give the students a better education in the field of recreation.

This field of recreation has been and will be in the months and years ahead one of the biggest fields of workers within the state.

I had the chance to sit in on the meeting of October 14 with Mr. Whaley, Mr. Grace of the U. S. Forestry Service, Mr. Amundsen of the State Forestry, Mr. Forester of Fish and Game, Mr. Smith of the Stanislaus County Parks Department, and Mr. Peter Gaidula of District Three, Division of Beaches and Parks. We had the opportunity of looking over the findings of the questionnaire results. This certainly proved to me that this program should be started as soon as possible in order that we may have students working towards a goal in this field.

I realize that this will take a little time in setting up this type of a program, but I am sure we cannot delay a program such as this one. We need it badly to assist the students.

Sincerely yours,

Raymond (Fred) Spicer
Park Supervisor
Caswell Memorial State Park